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A NEW SPECIES OF THE *TIMASIUS LIVENS* SPECIES GROUP (HEMIPTERA: HETEROPTERA: HEBRIDAE) FROM CAMBODIA AND VIETNAM

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Summary. *Timasius alveus* Zettel et Pangantihon, sp. n. from Cambodia and Vietnam is described and illustrated. It belongs to the ‘*livens*’ species group of the genus *Timasius* Distant, 1909 and is characterised by some peculiar features of the male’s sterna and genitalia: sternum 4 with area of short pubescence; sterna 5–7 with shallow groove; pygophore with large paired appendages; proctiger apically with six stout setae. An updated diagnosis for the *Timasius livens* species group and a preliminary key to its species are added.

Key words: Gerromorpha, Hebridae, *Timasius*, new species, *Timasius livens* group, Southeast Asia.

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Резюме. Из Камбоджи и Вьетнама описан новый вид *Timasius alveus* Zettel et Pangantihon, sp. n. Он принадлежит к группе видов «*livens*» рода *Timasius* Distant, 1909 и характеризуется рядом специфических признаков стернитов и гениталий самца: 4-й стернит с опущенной площадкой; 1–7-й стерниты с неглубокой бороздкой; пигофор с большими парными придатками; проктигер (анальная область X тергита) с 6 толстыми щетинками на вершине. Приводятся определительная таблица видов и расширенный диагноз группы видов «*livens*» рода *Timasius*.

INTRODUCTION

Hebridae, or “velvet water bugs”, are a family of Gerromorpha, or semiaquatic bugs, an infraorder of Hemiptera. Gerromorpha include some well studied insects such as water striders, pond skaters, riffle bugs, and water measurers. In contrast, little attention has been paid to Hebridae over centuries. However, the outstanding contributions to the knowledge of this family by the Danish hemipterist Nils Møller Andersen (1981, 1982) has raised the interest in these tiny bugs, too.

Andersen (1981) was also the first revisor of the genus *Timasius* Distant, 1909; his group concept is still accepted with little modifications (e.g., Zettel & Chen, 2000 added a new species group from Borneo). While Andersen (1981) included only 15 species distributed from Pakistan to Indonesia (of which ten were new to science), we know today that the genus is speciose in the Himalayas and in mainland Southeast Asia (e.g., Zettel, 2004, 2012). One reason for the former scarcity in collections is the mode of life: *Timasius* species have a narrow ecological niche and preferably live on wet rock faces, usually along the margin of shaded creeks and streams (Andersen, 1981, and personal observations). This means that, compared to other Gerromorpha, species of *Timasius* were rarely or just by chance included in samples of limnological projects.

Nevertheless, more target-oriented collections during the last decades yielded the discovery of numerous species, so that 40 species have been described until today (see Zettel, 2013 as the last contribution). At present we know two centres of diversity: whereas the *T. major* and the *T. rupestris* species groups chiefly radiated in the Himalayas (Andersen, 1981; Zettel, 2012), the *T. chinai* group occurs in Southeast Asia and extends eastwards to Java (Zettel, 2012). The *T. livens* group – to which the new species belongs – shows the widest distribution, with species known from northern Pakistan eastwards to Taiwan and Vietnam.

Species of *Timasius* share long antennae with a subdivided antennomere 4 and strongly developed bucculae (platelike ventral extensions of the head) with *Hebrus*, but differ from this genus by the paired longitudinal carinae of the thoracic venter converging posteriorly and meeting on the metasternum (parallel and not meeting in *Hebrus*). Detailed diagnoses of *Timasius* were given by Andersen (1981) and Chen *et al.* (2005).

MATERIAL AND METHODS

Specimens are dry-mounted, glued on card boards. Genitalia of the holotype and some paratype males have been dissected and glued on card boards together with the specimen. Material is referred to by citing the original labels, which are marked with quotation marks (""); the backslash sign (\) indicates the break of a line. The description of the new species was made using a Wild M10 binocular microscope (max. 128 \times magnification). Terminology follows Andersen (1981) and Zettel (2011). Acronyms for measurements and indices follow Zettel (2011).

Illustrations: Stacked digital images (Figs. 1–2) were taken with a Leica DFC490 camera attached to a Leica Z16 APO zoom microscope, using Leica Application Suite v4.12.0. Images were stacked with ZereneStacker 1.04 64-bit, and processed with Adobe Photoshop (7.0 or Elements 8). Line drawings of head and metanotal elevation (Figs. 3–6) were prepared with the help of a camera lucida fixed to a Wild M10 binocular microscope. Line drawings of the genital structures (Figs. 7–10) were made with an Olympus BX40 microscope with a camera lucida at magnification of 200 \times and 400 \times .

TAXONOMY

Genus *Timasius* Distant, 1909

The *Timasius livens* species group

DIAGNOSIS. Dorsal integument usually black (in all described species). Base of forewing with bluish or grayish frosted areas, without white spots. Entire dorsal surface without erect setae; short, thick, appressed setae with metallic shimmer present on head, thoracic nota, and

bases of forewings. Buccula with two circular or slightly ovate impressions, posteriorly with two processes, the dorsal one short and acute, the ventral one variable in shape. Metanotal elevation short (Fig. 1); its free apex (in lateral aspect) short. Legs without spines. Genitalia of males small: pygophore in some species with dorsolateral apodemes covering entire paramere or only its base; proctiger often with groups of stout setae; parameres in most species with dorsal teeth, but always without apical hook, usually slightly asymmetrical.

SPECIES INCLUDED. This clade contains only five described species from Pakistan, north-western India, Nepal, Myanmar, and Thailand (Andersen, 1981; Zettel, 2011, 2012). However, it is in fact very diverse, especially in Southeast Asia.

Provisional key to species of the *Timasius livens* group (males)

IMPORTANT NOTE. When using the key, bear in mind that there are several undescribed species in this group!

- | | | |
|---|---|----------------------------------|
| 1 | Ventral buccula process pointed (e.g., Fig. 4) | 2 |
| - | Ventral buccula process rounded or truncated | 3 |
| 2 | Distolateral processes of pygophore slender, directed posterolaterally, and apically acute. Proctiger with two groups of stout setae on each side. Sterna not conspicuously modified. (North Pakistan, North India) | <i>T. minor</i> Andersen, 1981 |
| - | Distolateral processes of pygophore stout, curved medially, and apically truncate (Fig. 7). Proctiger with six very stout setae apically (Fig. 8). Abdominal sterna with patch of velvety pilosity and groove (Fig. 2). (Cambodia, South Vietnam) | <i>T. alveus</i> sp. n. |
| 3 | Buccula high and short. Proctiger slender, almost twice as long as wide. Parameres with row of long, stout, black setae. (North India, Nepal) | <i>T. tachamoae</i> Zettel, 2012 |
| - | Buccula normal. Proctiger about as long as wide or slightly transverse. Parameres usually without long, stout setae (this character intermediate in <i>T. goldmarie</i>) | 4 |
| 4 | Proctiger laterally with prominent stout setae | 5 |
| - | Proctiger without prominent stout setae. (Myanmar) | <i>T. schaeferi</i> Zettel, 2011 |
| 5 | Pygophore with paired lateral processes. Proctiger transverse. (North Thailand) | <i>T. livens</i> Andersen, 1981 |
| - | Pygophore simple, without lateral processes. Proctiger slightly longer than wide. (Myanmar) | <i>T. goldmarie</i> Zettel, 2011 |

Timasius alveus Zettel et Pangantihon, sp. n.

<http://zoobank.org/NomenclaturalActs/0EC6EB6F-C6FA-485A-B1F1-A76BFBC4B36F>

Figs 1–10

TYPE MATERIAL. Holotype – (macropterous male, Natural History Museum Vienna), labelled “**Cambodia**: Mondulkiri Prov. \ Saen Monourom City, W Kroeng \ Saen Monourom, N 12°26.58' \ E107°09.58', 612 m, 22.XI. \ leg. Pangantihon P592 (MO-4)”. Paratypes: 1 macropterous male (in the collection of the first author, genitalia lost), same label data; 9 macropterous males, 3 macropterous females, labelled “**S Vietnam**, 40 km NW An Khe\ Buon Luoi, 14°10'N, 108°30'E\ 620-750m, 28.3.-12.4.1995\ leg. Pacholatko & Dembicky” (Natural History Museum Vienna, Zoological Collection of Biological Museum at Hanoi University of Science).

TYPE LOCALITY. **Cambodia**: Mondulkiri Province, Saen Monourom City, west of Kroeng Saen Monourom Waterfall, N 12°26.58', E107°09.58', 612 m a.s.l.

HABITAT AT TYPE LOCALITY. The specimens were collected from wet rocks in the vicinity of the falls.

DESCRIPTION. **Macropterous male.** Measurements of holotype: BL 2.66, HL 0.61, HW 0.49, A₂L 0.25, PL 0.60, PW 1.18, MtL 1.02, AW 1.07. Indices: HI 125, Atl 82, EI 67, AnI 57, PHI 241, PnI 197, MMI 43, Mtl 87, AbI 223. Relative lengths of antennomeres 1–4 (in % of antennomere 2): 135 : 100 : 130 : 223. Relative lengths of leg segments (in % of metatibia): profemur 55, protibia 60, protarsus 20, mesofemur 61, mesotibia 70, mesotarsus 22, metafemur 83, metatibia 100, metatarsus 27.



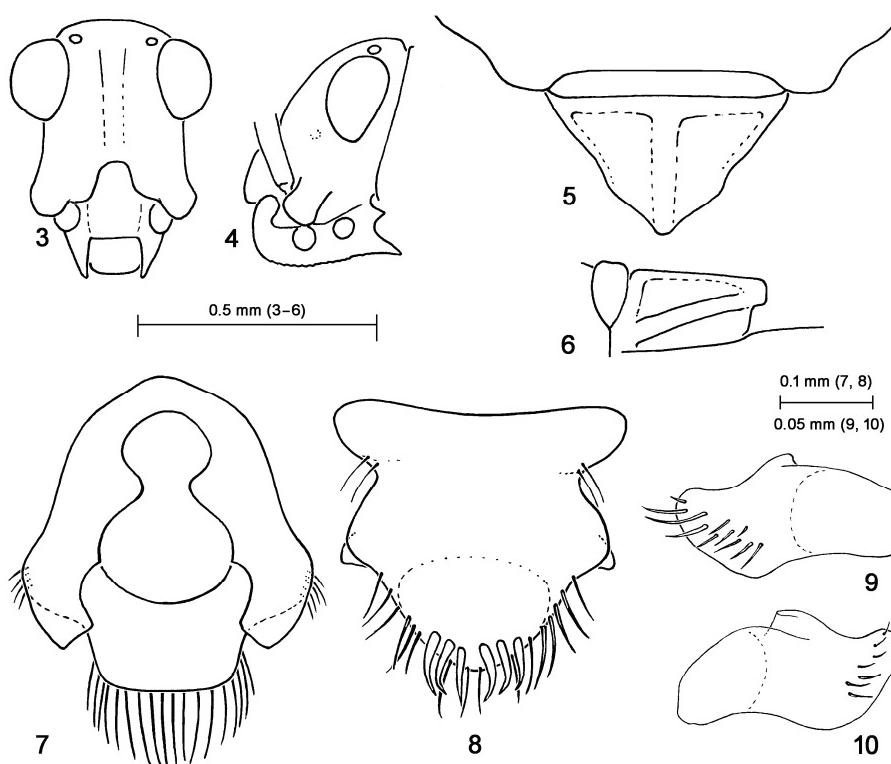
Figs. 1–2: Habitus of *Timasius alveus* sp. n., male, in dorsal (1) and ventral (2) aspect. © Harald Bruckner.

Measurements of paratypes (n = 10): BL 2.68–2.99, HL 0.62–0.66, HW 0.49–0.51, A₂L 0.24–0.26, PL 0.61–0.65, PW 1.19–1.28, MtL 1.01–1.12, AW 1.06–1.27.

Colour (Figs 1–2): Trunk black. Buccula yellow. Antenna black. Legs from coxa to base of femora yellow; distal parts of femora turning to brown. Tibiae and tarsi black. Each cell of forewing with relatively small frosted mark at base; membrane with indistinct greyish spots.

Pilosity: Dorsum of head, thorax, and corium with rather sparse, thin, golden, subcumbent pilosity, comparatively dense on anterior lobe of pronotum, mesoscutellum, and terminal vein of forewing. Venter and sides of body with thin, subcumbent, whitish pilosity.

Structures: Body stout, with rather short antennae and legs. Head (Figs 3, 4) comparatively short; sides between anterior margin of eyes and small, rounded antennal tubercles slightly divergent. Preocular tubercles weakly developed. Middle furrow on posterior of head deep. Anteclypeus shiny, compressed, in lateral aspect convex. Buccula (Fig. 4) moderately wide, with two round circular impression, posteriorly with two processes: dorsal one small and acute, slightly pointing to side, ventral one hardly longer, apically acute, slightly curved medially.



Figs. 3–10: Habitus of *Timasius alveus* sp. n., male: (3) head, frontal aspect; (4) head, lateral aspect; (5) mesoscutellum and metanotal elevation, dorsal aspect; (6) mesoscutellum and metanotal elevation, lateral aspect; (7) pygophore, dorsal aspect; (8) proctiger, dorsal aspect; (9) right paramere, lateral (external) aspect; (10) left paramere, lateral (external) aspect.

Pronotum wide, sides with angular emargination; surface, except for anterolateral callosities and humeri, with deep punctures; anteriorly between paired swellings with three parallel, very deep longitudinal impressions. Metanotal elevation (Figs 5, 6) short, 2.0 times as wide as long, subtriangular; apex sharply pointed in dorsal aspect, in lateral aspect free tip appearing truncated. Forewing posteriorly reaching end of abdomen, laterally distant from connexival margins. Ventral thoracic carinae as characteristic for the genus (Fig. 2). Legs very slender, not modified. Abdomen in dorsal aspect only slightly widened from base to midlength, posteriorly ovate, almost evenly rounded apically, only weakly truncated. Abdominal venter strongly modified (Fig. 2): sternum 3 with small, roundish tuft of erect setae at middle of hind margin; sternum 4 with broad pad of brown velvety pilosity; sterna 5–7 with broad, but shallow medial groove; groove margins laterally not crested, posteriorly sharply delimited by a raised transverse elevation of segment 8. Segment 8 short, constricted at midlength; anterior portion narrower than posterior portion which contains the genitalia; posterior part with a subterminal crest ventrally. Genitalia short and broad. Pygophore (Fig. 7) symmetrical, strongly widened, ventrolaterally extended into rounded lobes, (postero-) dorsolaterally extended into broad,

mesally curved and apically truncated lobes; distal part transverse, truncated. Proctiger (Fig. 8) almost symmetrical, small, laterally with short ventrolaterally directed processes; apex rounded, bearing six short, very stout setae. Parameres (Figs 9, 10) very small, slightly asymmetrical; left paramere with a larger dorsal tooth and with less developed setae than right paramere.

Macropterous female. Measurements of paratypes ($n = 3$): BL 2.72–2.82, HL 0.62–0.64, HW 0.49–0.53, A₂L 0.25–0.27, PL 0.60–0.66, PW 1.18–1.22, MtL 1.03–1.09, AW 1.08–1.15.

Colour, pilosity, and structures similar as in males. Abdominal sterna unmodified. Gono-coxa flat, unmodified. Proctiger small, with some moderately long setae.

COMPARATIVE NOTES. *Timasius alveus* sp.n. clearly belongs to the *T. livens* species group as defined by Andersen (1981), Zettel & Chen (2000), and above. *Timasius alveus* sp. n. shares a pointed ventral buccula tooth with *T. minor* from Pakistan and India, whereas all other species – described or undescribed, as far as known to the authors – possess truncated or broadly rounded ventral buccula teeth. The male of *T. alveus* sp.n. is unique in the group by both the sternal characteristics (Fig. 2) and the broad genitalia (Figs. 7, 8). The female can be differentiated from *T. minor* by larger size (BL 2.7 – 2.8 mm vs. 2.2 – 2.5 mm in *T. minor*). *Timasius alveus* sp.n. is among the largest species of the *T. livens* group, together with *T. tachamoae* Zettel, 2012 from Nepal (BL 2.6–2.8 mm) and *T. livens* (BL 2.6 mm) from Thailand.

ETYMOLOGY. The species epithet is a noun in apposition; it is the Latin word for a shallow groove. The name refers to the large, round impression on the abdominal sterna of the male.

DISCUSSION

At present, the *Timasius livens* group includes six described and a good number of undescribed species, chiefly from Southeast Asia (Zettel, 2012, this paper). While a proper identification of males of *Timasius* is usually feasible by genitalia and abdominal structures, females that are not associated with males cannot always be assigned to species. Their few distinguishing characters (size, buccula, pilosity, colour) are not sufficient to separate all species. Further large efforts will be necessary to comprehensively cover the true diversity of *Timasius* in Southeast Asia.

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